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Research of Factors Adjustment and Strengthening Effect on Consulting Evaluation Model

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Abstract

Along the process of consulting operation for the four modules of MCS, by alternating Man-Machine to adjust and apply the consulting factors respectively. Four modules generate different types of strengthening effects, just like the choosing enhancement of multi-factor decision-making and consignor and experts factors leading, the technical supporting enhancement of factors structurization and factors combination around the scheme topic. Using the two methods of SEA and AHP to evaluate their strengthening effect can assess the dynamic and static effectiveness of MCS at the same time. SEA method assesses the dynamic performance of MCS by comparing the matching degree of trajectory of MCS and mission orbit of MCS in the same space. AHP method analyses by strengthening effect produced in the aims and means link of MCS. Finally MGEM method can be used to describe the static score of the factors on System Effectiveness.

*Keywords:*Management Consulting System (MCS); System Evaluation; Factor Analysis; SEA Method; AHP Method

1. Introduction

New enterprises consulting evaluation model (Management Consulting System-MCS, Gefu Liang，2004)[1] generate three types of strengthening effect to the enterprises consulting evaluation process. The

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first is generated in the functional links of the MCS programs[2]. The second is generated as the combination of different consultation methods embedded into different lifecycle of enterprises 3. The third is generated as MCS applying the basic factors adjustment of the process. As the first two effects have been discussed in different research papers, this article discusses the third strengthening effect.

2. The basic factors adjustment of the MCS consulting process

According to the four analysis combinational modules in the MCS mode proposed by Gefu Liang (2004), in the implementation process of new enterprises consulting evaluation model, the adjustment of 4 modules from I to IV is shown in Fig.1.

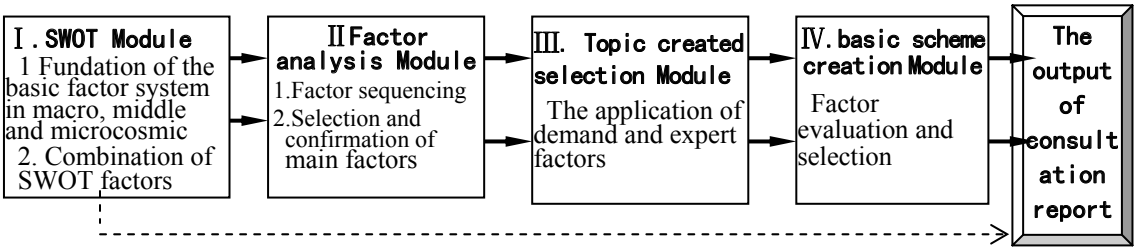

Fig.1. the factors adjustment process of 4 modules in MCS

In the first stage of I module: the consulter collect, analyze and understand the information of the consulted enterprises' internal and external environment at first. Then search and establish the basic factors system which probably related to the enterprises exiting problems and affecting its survival and development. This basic factor system can be classified by SWOT and other methods, described and ordered quantitatively by using initial scoring and extracting expectation. This factor system is not only the basis of MCS model to implement consultation and evaluation to enterprises but also the foundation of factor adjustment in MCS model operation process.

Actually Module Ⅱ starts to analyze and adjust the factors of Module I using technical means. Firstly, determine the main factors affecting enterprises through ordering and classifying summation to SWOT factors. Then analyze the enforcement of SWOT factors so as to judge the enterprise's strategic strength and situation and provide the background to select factors and construct solutions in certain circumstances.

ModuleⅢ is the application and combination process of demand choice factors and factors which are judged and created by experts. Demand choice is just embedding the intention of the assignor, organize and review the needed factors of consulting evaluation model, in order to fit for the assignor's requirements. Expert judgment creation is that in the guide of assignor's requirements, according to the background provided by Module Ⅱ, consultation experts put forward the program theme to solve the problem with his own experience and creativity. Then combine various relative factors and construct consultation scheme taking the program theme as the main line.

Module □ is the technology process of concrete plan combination and evaluation adjustment to the combination factors. On one hand it can give potency evaluation to the scheme and its composition factors, on the other hand it can adjust and balance them.

3. The Types the Factor Adjustment and Effect Strengthening Along With MCS Process

Along the MCS model from Ⅰ-Ⅳ four modules flow, in the process of building consultation program, resulting in a series of strengthening effect of multi-factor reinforcement, selective reinforcement, technical reinforcement, target reinforcement and enhanced creativity of expert makes the use of MCS model of the consulting evaluation program create an unprecedented effect.

3.1. Module I is the first selective strengthening type (E1) characterized as multi-factor decision-making.

In module I, experts and the consulted select and collect the basic factors influencing the survival and development of enterprises, which classified and compared along SWOT mainline. Normally, the four forms of SWOT can collect about 40 influencing factors, which derived from more than 10 experts or professional department. It's totally essential for the consultation and decision of the enterprises, as a subsystem of society to be embedded into the factors background from experts' repeat considerations and judgments. (In fact, all factors and its intensity selected of SWOT table should be determined by Delphi method). Obviously, compared with the traditional consultation background, the strengthening effect E1 of module I, improves the decision reference fundamental value through applying multi- factors. As the reference basis of decision in this module, if set up: Full information reference value I1 ≥ Limited information reference value I2; More experts judgment reference value M1 ≥ Less experts judgment reference value M2; classification factors reference value F1 ≥ messy factors reference value F2, There is E1=I1+M1+F1≥I2+M2+F2.

3.2. Module Ⅱ is the first technique strengthening type (E2) characterized as factors importance and overall form judgment.

Actually, Module Ⅱ is preliminary treatment to the collective factors of module I through computer technology system. Including: (1) In the importance sequence of classification factors, find out the industry's critical success factors (CSF) in the form of obtaining expectations of various factors importance and influence degree;(2) Apply the strength analysis and strategic posture analysis of all factors of SWOT to search the direction positioning of consultation scheme theme under the background of structured environment. In this module, if true: Reasonable reference and the effect of using CSF S1≥No CSF effect S2； The judgment effect with structured background orientation B1≥ the judgment effect with no structural background orientation B2. There is E2= S1+B1≥S2+B2.

3.3. ModuleⅢ is the second selective reinforcement type characterized as emphasizing the intention of the consignor and factor exertion of experts (E3).

Regarding the CSF provided from module II as reference and in the structured background, modules Ⅲ sets the topic of the consultation programs from two aspects. (1) Meet the need of consignor further more through further emphasizing and correcting the intention of consignors. (2) Exert experience and creativity of experts completely to improve the value of consultation themes and programs further more. In this module, if set up: Emphasized demand effect D1≥ unemphasized demand effect D2, Expert factors exertion under special reference situation M1≥Expert factors exertion without special reference background M2,then E3 = D1 + M1 ≥ D2 + M2.

3.4. Module Ⅳ is the second technical strengthening type characterized as the combination and adjustment of each factors surrounding the consultation topic (E4).

The strengthening effect formed by Module Ⅳ mainly generated from the use of computers to simulating combine the main factors provide by Module Ⅲ and the logic inherence and adjustment engendered at the last phrase of MCS. The concrete strengthening effects include four aspects: main factors influencing effect, the coverage degree estimate effects, the multi-schemes effects, SWOT close-loop feedback effects. Comparing to the traditional consultation forms, these strengthening effects from the four aspects are positive apparently. If the below hypothesis come into existence in this module, then E4= A1+C1+P1+R1≥A2+C2+P2+R2. This module including the following inequalities: The design effect A1 of factors constitution around the theme ≥ The effect A2 of non-factors constitution around the theme, The effect of program control C1 with coverage estimate ≥ The effect of program control C2 without coverage estimate, The consignors' satisfaction provided with many programs P1 ≥ The consignors' satisfaction provided with single program P2. The positive effect R1 of SWOT close-loop feedback factors adjustment ≥ the effect R2 of non-close-loop feedback adjustment.

There are 10 types of strengthening effects as evaluation indices produced in the MCS process of the above four modules, concluded as shown in table 1. In Table 1, the E1, E2, E3, E4 are ≥ 0, and therefore, E1 + E2 + E3 + E4 ≥ 0, which simply demonstrates MCS in its module process is possible to generate positive reinforcement effect.

Table. Ⅰ 10 strengthening effect (indices) of Management consultation systems

Strengthening effect $\mathbf{E_S}$ of MCS

Module Ⅰ (E1) Environmental consultation Analysis Module	Reference value of sufficient information I_1 Reference value of category factor F_1
Module Ⅱ (E2) Factors Analysis Module	Effect of reasonable reference and application of CSF S_1 Judgment effect with structure background orientation B_1
Module Ⅲ (E3) Selection module of scheme themes	Effect of emphasizing the demand of consignors D_1 Exertion of expert factors with special reference background M_1
Module Ⅳ (E4) Generation module of Basic Plan	Design effect of combining factors around the theme A1 The scheme control effect of coverage estimate C_1 Increasing satisfaction of consignors provided multi solutions P_1 Positive effects of SWOT closed loop feedback factors adjustment R_1

4. Estimate for the strengthening effect of MCS factors adjustment

But in the estimate of strengthening effect, because MCS is complex system of man-machine combination, we propose to combine qualitative and quantitative methods together and adapt the evaluation form performing dynamic and static form at the same time.

As evaluating dynamic performance of the system, SEA (System Effectiveness Analysis) method compares the track of MCS with the mission trajectory of MCS in the same public attribute space. The contrast standard is the measure of the measuring "tracks", such as volume measurement. At this moment, the performance of objective object is connected with the demand of objective object. Through the "contrast" , get system performance index value.

Generally, AHP(Analytic Hierarchy Process - AHP) method divides influence factors into several levels with subordinate or dominations relations, judge the importance degree for a criterion of the same level factors, get the obtained results pushing layered up and conclude the hierarchical relationships of various factors' "contribution" on system performance. That is, evaluate system effectiveness by analyzing the significance of various factors' "contribution" on system performance.

The process of combining with SEA and AHP to judge the strengthening effectiveness produced in each MCS module is shown as fig.2.

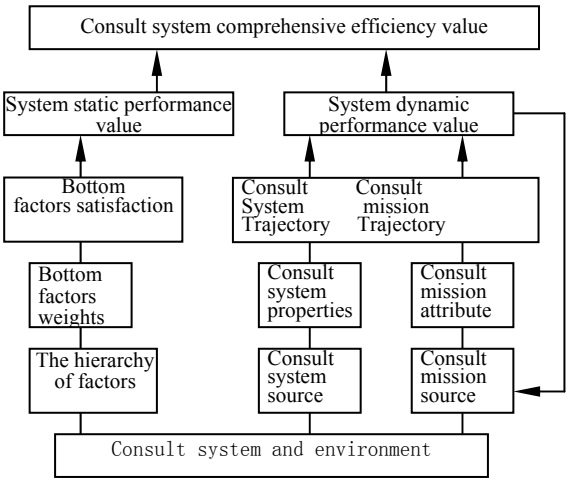

Fig.2 The sketch map of the process of MCS effectiveness evaluation by SEA and AHP

Applying AHP method, the static performance of MCS systems summarized in Table 1 can be evaluated .The concrete estimation process can refer to the analysis of the strengthening effect from the links of aims and means in MCS, which discussed by authors in literature 2. Finally, Compatible with the AHP method, the static scores of various factors in system performance can be described through MGDM method.

When using the SEA method to estimate the dynamic performance of the MCS, Huang Luying (2010) concluded that the mission of consultation system can be described in four aspects, such as enhancement of conditional coverage, examination of enterprise problems, customer satisfaction， improvement of scheme value. She proposes to use three comprehensive indices of system reliability, customer satisfaction, the detection rate of problems to describe the target efficiency of the consultation system. And the Mapping relation of subject-object systems in the space is as figure.3 shows. Through subject-object systems' further mapping converse in the space, the indices of consultation system attributes meeting the requirements of conciseness, quantifiable, relative independence are: reliability λs, customer satisfaction S, the rate of question detection P. the three comprehensive indices of the system.5 The expression of the three comprehensive indices are as follows respectively:

$\lambda s=\lambda 0*\lambda 1*\lambda 2$ (λ0-The undertaken ability of system links，λ1- Information collection ability,λ2-Information processing capability)

$S = \mu *P$ (P is the degrees of value for scheme，μ is the similarity degrees of cognition to the scheme by both of the consulter and the consulted)

$P=\xi(A+B)$ (A - System backup ability, B - the compatibility of system software, ξ - conditions coverage degree)

If set R as the consulting effectiveness of MCS, There is: $R(\lambda s,S,P)=(\lambda 0*\lambda 1*\lambda 2)+(\mu *P)+\xi(A+B)$

As for the traditional consultation process R′ of UN-MCS, exists: $\lambda s\geq\lambda s'$， $S\geq S'$， $P\geq P'$

So: $R(\lambda s,S,P)\geq R'(\lambda s', S', P')$

In the exceptions expression of three-dimensional effectiveness volume comparison, which is constituted by three factors: λs, S, P, we can see $R\geq R'$, which means the effectiveness of generating scheme based on MCS is strengthened directly (figure 4).

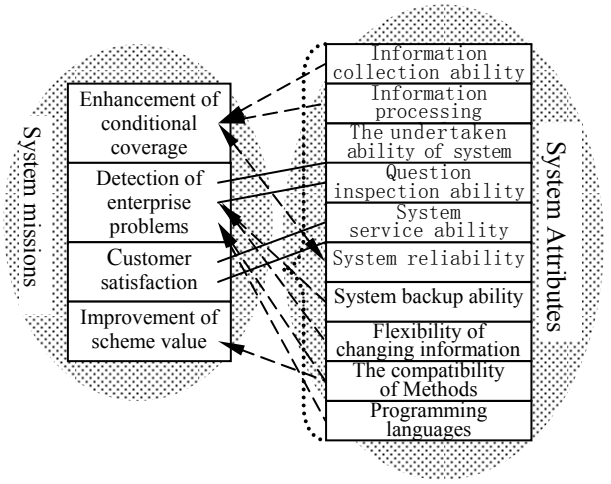

Fig.3. The Influence Relations of System missions and System property

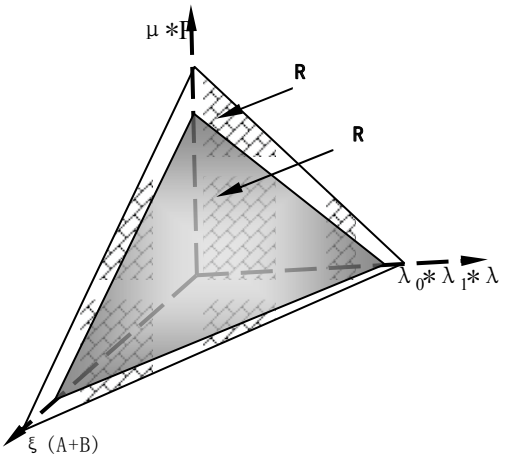

Fig.4. Efficiency Contract of the consultation system based on SEA method

Acknowledgement

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References

[1] Liang GeFu, Pang Dalian，SWOT Technique and the Research of the Generation of Management Consulting Schemes(C), ICM’(Macao), May.2004，pp 1330-1334

[2] Liang Gefu , Pang Dalian,YANG Yu, XU Po ， The Strengthening Effect of Project Generation to Consulting Process(C)，2010 International Conference on E-Business and E-Government(Guangzhou)，May.2010，pp2591-2594

[3] Liang Gefu. Pang Dalian. Liang Yuming，Study on The Lifecycle Critical Factor Adjust and The Data Mining Method Match(C)，International Symposium on Education and Computer Science (ECS2009) , Mar.2009 pp.407-411

[4] Liang Gefu. Tian Yuan. Wang Bo, The Reference Model and Critical Element Confirmation about the New High-Enterprise Dynamic Growth Consultation(C)，Management Innovation and Industrial Engineering for the Rise of Central China(IE & EM2008) Sept.2008 pp.2051-2055

[5] Zhong Yan. Sheng Zhi-ying，Study on Operating Performance of Listed Agricultural Company(J)，Technoeconomics & Management Research，2009(6):21-23

[6] Dersin P and Levis A. H. Large Scale System Effectiveness Analysis. LIDS-FR-1072,1981

[7] Wu Zhi-hui,ZHANG Duo-lin,XIE Lei-feng，Evaluation of the operational effectiveness of the information warfare of air defense(J), Systems Engineering and Electronic, Feb·2004(26):209-211

[8] Huang Luyin，Strengthening Effect Research of Program Generation in The Consultation Process(D)，The dissertation master's degree of Guangxi university(in China) Jul.2010